We claim:

1. A coil for magnetic resonance imaging comprising:

a first electrically conductive ring forming an inferior end of the coil;

a plurality of legs extending from the first electrically conductive ring, each of the plurality of legs having a linear portion and a tapered portion; and

a second electrically conductive ring forming a superior end of the coil, the second electrically conductive ring being connected to the tapered portion of the plurality of legs.

2. The coil of claim 1 further comprising a plurality of reactive electrical components connected within the electrically conductive rings and the legs.

3. The coil of claim 1, wherein the second electrically conductive ring has a diameter that is smaller than a diameter of the first electrically conductive ring.

4. The coil of claim 3, wherein the tapered portion of the plurality of legs has a radius that is selected to maximize homogeneity in a field pattern of the coil.

5. The coil of claim 4, wherein the field pattern is a magnetic flux density in at least one of an XZ and a YZ imaging plane.

6. The coil of claim 1, wherein the tapered portion of the plurality of legs comprises at least one angled linear segmented section.

7. The coil of claim 1, wherein the first electrically conductive ring and the second electrically conductive ring are circular

8. The coil of claim 1, wherein the first electrically conductive ring and the second electrically conductive ring are elliptical.

9. The coil of claim 1, wherein at least one of the electrically conductive rings is tapered larger relative to the center of said coil to provide a concentrated magnetic flux density within a region centered within the coil.

10. The coil of claim 1, further comprising at least one additional magnetic resonance (RF) coil positioned to at least partially overlap the coil.

11. The coil of claim 1, wherein the coil is a receive only coil.

12. The coil of claim 1, wherein the coil is a transmit/receive coil.

13. The coil of claim 1, wherein a ratio of a length of the legs to a diameter of the first electrically conductive ring is approximately 1:1.

14. A coil for magnetic resonance imaging comprising:

a first electrically conductive ring forming an inferior end of the coil;

a second electrically conductive ring forming a superior end of the coil; and

a plurality of legs extending between the first electrically conductive ring and the second electrically conductive ring, each of the plurality of legs having a linear center portion and a tapered portion at each end.

15. A method of making a birdcage resonator having a plurality of legs to provide improved homogeneity while maintaining signal-to-noise performance, the method comprising the steps of:

constructing a wire model of the birdcage resonator;

calculating a magnetic flux density within the birdcage resonator; and

adjusting at least one of an end ring diameter and a radius of taper the plurality of legs to improve homogeneity of the magnetic flux density.

16. A method as claimed in claim 11, wherein the improved homogeneity of the magnetic flux density is determined by applying a Biot-Savart model to the wire model.

17. A method as claimed in claim11, wherein the homogeneity of the magnetic flux density is determined by experimental verification.